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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/669,784	09/25/2000	Gordon Israelson	00P7919US	3754

7590 01/02/2002

Siemens Corporation
Intellectual Property Department
186 Wood Avenue South
Iselin, NJ 08830

EXAMINER	
YUAN, DAH WEI D	
ART UNIT	PAPER NUMBER
1745	3

DATE MAILED: 01/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

MK-3

Office Action Summary	Application No.	Applicant(s)	
	09/669,784	ISRAELSON, GORDON	
	Examiner	Art Unit	
	Dah-Wei D. Yuan	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-10 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DESULFURIZATION FOR FUEL CELL SYSTEMS USING SULFUR SEPARATING MEMBRANES

Examiner: Yuan S.N. 09/669,784 Art Unit: 1745 December 28, 2001

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. The term "essentially" in claims 1,7,10 is a relative terms which render the claims indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carnell et al. (US 4,978,439) in view of Preston, Jr. (US 4,202,865).

Carnell et al. disclose a desulphurization process for a feedstock stream comprising a hydrocarbon such as natural gas. The sulphur compounds initially present in the feedstock stream include hydrogen sulphide and/or carbonyl sulphide, and possibly carbon disulphide, methyl mercaptan, diethyl sulphide, and/or tetrahydrothiophene. For many applications the maximum acceptable sulphur content may be below 1 ppm, or even below 0.1 ppm. Carnell et al. first teach a separation stage including a membrane separation or sorption using a regenerable absorbent material. After the membrane separation, a concentrated sulphur compound-containing stream is subjected to a hydrodesulphurization process and subsequent sulphur removal stages to produce an effluent stream of reduced sulphur content. See Column 1, Lines 1-25; Column 2, Lines 6-13; 41-53; Column 6, Lines 44-55. However, Carnell et al. do not teach the use of the resulting feed fuel for a fuel cell system. Preston, Jr. discloses that reduction in the sulphur content in the fuel feed is desirable for economic considerations relative to the life and performance of the steam reform reactor catalyst in fuel cell power plants. See Column 1, Lines 15-25. Therefore, it would have been obvious to one of ordinary skill in the art to operate fuel cell power plants using a desulphurized natural gas as the feed for the reforming operation, because Preston, Jr. teaches low sulphur content is critical for the life and performance of the power plant. In addition, the disclosure of Carnell et al. differs from Applicant's claims in that Carnell et al. do not specifically discuss the compression of sulfur-containing fuel gas to 3

atmospheres and the measurement of gas flow in the downstream of the membrane. It is well known in the art that pressure differential is essential to operate the membrane and flow rates are proportional to the pressure differences. Therefore, it would have been obvious to one of ordinary skill in the art to pressurize the fuel gas stream above 304 kpa and measure the downstream gas flow, because one of ordinary skill in the fuel cell art would recognize the need to correlate gas flow rate with the effective operation of the membrane.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (703) 308-0766. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gabrielle Brouillette can be reached on (703) 308-0756. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2340.

Dah-Wei D. Yuan
December 28, 2001

CAROL CHANEY
PRIMARY EXAMINER